WHAT IS CLAIMED IS:

1. A confocal microscope system for examination of a sample, comprising:

a source for a laser beam;

a diffraction medium which interacts with the laser beam to produce a plurality of laser beams; and

an optical component to apply the plurality of laser beams to the sample.

2. The confocal microscope system as defined in Claim 1 further including a detector to sense light beams scattered from the sample.

3. The confocal microscope system as defined in Claim 2 wherein the detector comprises a pixellated area detector.

4. The confocal microscope system as defined in Claim 2 wherein the detector comprises a position-sensitive image-forming photodetector.

5. The confocal microscope system as defined in Claim 4, wherein the position-sensitive image-forming photodetector comprises a charge coupled device.

6. The confocal microscope system as defined in Claim 4, wherein the position-sensitive image-forming photodetector comprises a complementary metal-oxide-semiconductor detector.

7. The confocal microscope system as defined in Claim 4, wherein the position-sensitive image-forming photodetector comprises a photodetector array.

8. The confocal microscope system as defined in Claim 4, wherein the position-sensitive image-forming photodetector comprises a microchannel plate.

9. The confocal microscope system as defined in Claim 1 wherein the plurality of laser beams arising from the diffraction medium are generated to interact simultaneously with a plurality of sample volumes.

10. The confocal microscope system as defined in Claim 1 wherein the diffraction medium comprises a holographic element.

11. The confocal microscope system as defined in Claim 1 further including a relay lens disposed downstream from the diffraction medium.

12. The confocal microscope system as defined in Claim 11 further including a beam splitter and an objective lens receiving a laser beam from the beam splitter.

13. The confocal microscope system as defined in Claim 12 wherein the beam splitter operates to pass light reflected from the sample and enables the light to strike an area detector.

14. The confocal microscope system as defined in Claim 13 further including an ocular lens disposed between the beam splitter and the area detector.

15. The confocal microscope system as defined in Claim 2 further including computer software executable for establishing virtual alignment of the plurality of laser beams at positions on the detector.

16. The confocal microscope system as defined in Claim 15 wherein the virtual alignment includes calculating a phase shifting pattern implemented by the diffraction medium.

17. The confocal microscope system as defined in Claim 15 wherein a uniformly reflective surface is imaged by using the computer software and a computer calculates a hologram which projects light spots on selected pixels of the detector.

18. The confocal microscope system as defined in Claim 1 wherein the diffraction medium comprises an addressable spatial light modulator, thereby enabling dynamic change of sample volumes undergoing illumination by the plurality of laser beams.

19. The confocal microscope system as defined in Claim 18 wherein the spatial light modulator is programmed to cause scanning of a selected area slice of the sample.

20. The confocal microscope system as defined in Claim 15 wherein the computer software operates to reject sensed light signals arising from a zone of confusion around a confocal region of interest in the sample.

21. The confocal microscope system as defined in Claim 1 further including computer software executable to select at least one of the plurality of laser beams to increase its light intensity and use the at least one laser beam as an optical tweezer.

22. The confocal microscope system as defined in Claim 1 wherein the diffraction medium comprises a reflection-mode spatial light modulator.

23. A method of performing confocal microscopy on a sample, comprising the steps of:

providing a laser beam;

applying the laser beam to a diffraction medium having a preselected diffractive pattern;

outputting a plurality of diffracted laser beams from the diffraction medium, the diffracted laser beams having their spatial orientation defined by the preselected diffractive pattern; and

applying the plurality of diffracted laser beams to particular volume regions of the sample corresponding to the selected diffraction pattern.

24. The method as defined in Claim 23 further including the step of sensing light beams received from the particular volume regions of the sample.

25. The method as defined in Claim 23, further including the step of establishing a virtual alignment of the plurality of diffracted laser beams.

26. The method as defined in Claim 25, wherein the step of establishing a virtual alignment includes the calculation of a phase shifting pattern produced by the diffraction medium.

27. The method as defined in Claim 23, further including the step of enabling dynamic change of the particular volume regions being affected by the plurality of diffracted laser beams.

28. A confocal microscope system for examination of a sample, comprising:

a source for a laser beam;

a diffraction medium which interacts with the laser beam to produce a plurality of laser beams;

an optical component to apply the plurality of laser beams to the sample; and

means for detecting light beams scattered from the sample.

29. The confocal microscope as defined in Claim 28, further comprising means for establishing an alignment of the plurality of laser beams at positions on the detection means.

30. The confocal microscope as defined in Claim 28, wherein the diffraction medium comprises an addressable spatial light modulator, wherein the addressable spatial light modulator enables dynamic change of sample volumes undergoing illumination by the plurality of laser beams.

31. The confocal microscope as defined in Claim 30, wherein the addressable spatial light modulator is programmed to cause scanning of a selected region of a sample.

32. The confocal microscope as defined in Claim 28, wherein the diffraction medium comprises a reflection-mode spatial light modulator.